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Title : Crabeater Seals as APBTs Autonomous Pinniped Bathythermographs in the Western Antarctic Peninsula

Category : Ecology

Student :

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Abstract : The ability to interpret how apex predators utilize their environment depends on having concomitant oceanographic data of sufficient quality and resolution. While significant information is available from satellite remote sensing of the ocean surface, data are extremely sparse on the properties of the oceans water column. The lack of data on ocean variability is a major problem in modern oceanography and will limit our ability to understand the movements of marine mammals relative to the physical characteristics of their habitat. As part of the US GLOBEC research program into the diving and foraging behavior of adult crabeater seals (Lobodon carcinophagus), we collected data on water column temperature profiles. We outfitted 17 seals with Satellite Relay Data Loggers in the Marguerite Bay Region of the Antarctic Peninsula (~67 S, 67 W) during the austral fall-winter of 2002. Along with position and dive information these tags transmitted a "broken stick" representation of the temperature of the water column for between 4 to 145 days and produced 4895 bathythermographs. On average each seal completed 279 (30-893) casts that covered 59 (7-201) days completing 5.5 (0.4-10) casts/day. On average the casts reached 114 m with the deepest reaching 494 m. Data derived from these tags allowed us to document the presence of Antarctic Surface Water (AASW) in the narrow passages and fjords, the depth of the Circumpolar Deep Water (CDW) and the annual transition and cooling of the AASW to winter water. This transition corresponded to an oceanic heat flux of 31.7 W/m2 and compared quite well with ship based radiometer measurements. Although, animals have been used to derive water profiles in the Southern Ocean, this is the first time such data have been collected in the Antarctic Pack Ice Tag collected physical oceanographic data are collected on a spatial and temporal scale that are relevant to the animals behavior.